

Aus den Zahnmedizinischen Kliniken der Universität Bern  
Klinik für Parodontologie

Direktor: Prof. Dr. med. dent. Anton Sculean

Arbeit unter der Leitung von PD Dr. med. dent. Christoph A. Ramseier

# **Management of dental anxiety**

A cross-sectional survey in private dental practices in western  
Switzerland (Romandie)

Inaugural-Dissertation zur Erlangung der Doktorwürde der Zahnmedizin  
der Medizinischen Fakultät der Universität Bern

vorgelegt von

Patrick Jevan  
von Orbe, Kanton Waadt

Originaldokument gespeichert auf dem Webserver der Universitätsbibliothek Bern



Dieses Werk ist unter einem

Creative Commons Namensnennung-Keine kommerzielle Nutzung-Keine Bearbeitung 2.5

Schweiz Lizenzvertrag lizenziert. Um die Lizenz anzusehen, gehen Sie bitte zu

<http://creativecommons.org/licenses/by-nc-nd/2.5/ch/> oder schicken Sie einen Brief an

Creative Commons, 171 Second Street, Suite 300, San Francisco, California 94105, USA.

## Urheberrechtlicher Hinweis

Dieses Dokument steht unter einer Lizenz der Creative Commons Namensnennung-Keine kommerzielle Nutzung-Keine Bearbeitung 2.5 Schweiz.

<http://creativecommons.org/licenses/by-nc-nd/2.5/ch/>

**Sie dürfen:**



dieses Werk vervielfältigen, verbreiten und öffentlich zugänglich machen.

**Zu den folgenden Bedingungen:**



**Namensnennung.** Sie müssen den Namen des Autors/Rechteinhabers in der von ihm festgelegten Weise nennen (wodurch aber nicht der Eindruck entstehen darf, Sie oder die Nutzung des Werkes durch Sie würden entlohnt).



**Keine kommerzielle Nutzung.** Dieses Werk darf nicht für kommerzielle Zwecke verwendet werden.



**Keine Bearbeitung.** Dieses Werk darf nicht bearbeitet oder in anderer Weise verändert werden.

Im Falle einer Verbreitung müssen Sie anderen die Lizenzbedingungen, unter welche dieses Werk fällt, mitteilen.

Jede der vorgenannten Bedingungen kann aufgehoben werden, sofern Sie die Einwilligung des Rechteinhabers dazu erhalten.

Diese Lizenz lässt die Urheberpersönlichkeitsrechte nach Schweizer Recht unberührt.

Eine ausführliche Fassung des Lizenzvertrags befindet sich unter  
<http://creativecommons.org/licenses/by-nc-nd/2.5/ch/legalcode.de>

Von der Medizinischen Fakultät der Universität Bern auf Antrag der Dissertationskommission  
als Dissertation genehmigt.

Promotionsdatum:

Der Dekan der Medizinischen Fakultät:

## Summary

**Aims:** The main aim of the present study was to gain a better understanding of the management of dental anxiety reported by dental practitioners in western Switzerland. Further aims included the assessment of their current strategies to treat dental anxiety and their need for further education.

**Materials and Methods:** In 2013, an 18-item electronic questionnaire was created and sent to 726 dental practitioners identified from the of the Swiss Dental Association (SSO) database. A printed version of the questionnaire was sent by postal mail to a total of 28 dental practitioners where e-mail addresses were missing. Recipients were invited to reply by e-mail or postal mail, respectively. Up to three follow-up e-mails were sent.

**Results:** A total of 143 dental practitioners responded to the survey. Following validation, 140 (18.6%) questionnaires were included in the analysis. About four out of five practitioners (79.4%) involved with dental emergency service in their past had at least one occurrence with dental phobic patients. The majority of the respondents stated that both dental anxiety and dental phobia increases stress in the dental practice with frequencies of 90.0% and 88.5%, respectively. Among the 119 respondents using anxiety reduction methods (85.0%), overall 51 (42.9%) reported to use pharmacological methods while the majority (89.9%; n=107) used psychological methods. Female dentists compared with their male colleagues were using psychological anxiety reduction methods three times more frequently than male dentists reaching borderline statistical significance (OR=3.0, p=0.0591). Out of 140 respondents, only 28 (20.1%) have received education and training in dental anxiety reduction methods. The majority of these (66.4%; n=83) stated that their education and training was inadequate and 55.8% (n=77) requested further education and training in these methods.

**Conclusions:** Even though both female and male dentists reported to have experienced patients with dental phobia and increased stress levels when treating these patients, female dentists were more frequently using dental psychological anxiety reduction methods. In agreement with the requests from the respondents to this survey it can be concluded that more education and training of dental anxiety reduction methods are needed.

## **Introduction**

Dental fear or dental anxiety is an emotional response to the perception of either danger or threat related to dental treatment (1, 2). With 20% of the population being affected, dental anxiety has been recognized as a public health concern (3-9). More severe dental fear classified as dental phobia thus potentially leading to the avoidance of professional dental care involves 5% of the population (4, 10).

Even when dental anxiety and dental phobia were generally associated with a genetic predisposition they would still be considered as an emotional response to previous adverse events during dental treatment (1). When compared to dental anxiety, dental phobia has been described as a much more complex emotional response resulting from a variety of experiences and circumstances.

Both the origin and the intensity of dental anxiety vary from one individual to another. A variety of self-reported psychometric tests such as the Corah's Dental Anxiety Scale (DAS) may be used to assess the patient's level of dental anxiety (11, 12).

The individual's use of professional dental care relies on a diversity of factors including health-beliefs, access to care, financial restrictions, dental satisfaction, or dental anxiety. A recent study by Armfield and co-workers (2014) evaluated the association of dental satisfaction with the level of dental anxiety in a Swiss population (13). One of the strongest findings of the study was the level of satisfaction in the Swiss population with 96.5% of the responding population being satisfied with their dentists. These results are in coherence with the findings of Thomson and co-workers (1999) reporting that individuals with dental anxiety might be less satisfied with their dentists when previously experiencing dental visits as unpleasant and distressing (14).

Patients suffering from dental anxiety often report experiences with ineffective local

anaesthesia, oral pain, loss of control, and loss of confidence (15, 16). The consequences of dental anxiety such as missed appointments or late cancellations have been discussed as factors affecting stress (15-19). Consequently, Hakeberg and co-workers (1992) have demonstrated that severe dental anxiety was associated with poor oral health (2, 20-25). Additionally, a more recent study by Gisler and co-workers (2012) has identified a strong association between dental anxiety and poor quality of life. Highly anxious patients were 3.55 times more likely to suffer from poor quality of life compared with less anxious patients (26).

Treating patients with dental anxiety may cause irritation, anger, and frustration (16). Therefore, the treatment of patients with dental anxiety is often seen as time-consuming and economically unprofitable (16-18). An association between overall stress and dental anxiety has long been recognized and thus an increasing amount of research has been carried out to evaluate the level of stress within dental practitioners in such situations (18, 27). So far, there is only little knowledge on either the dentists' competence concerning the management of dental anxiety, their current treatment strategies, or their need for further education.

In a British study dentists generally agreed to have a responsibility to help their patients with dental anxiety (17). However, these dentists reported to lack the time necessary for the treatment of dental anxiety. Similar findings were first presented by Scottish study where the dentists reported to lack both the time and the confidence to treat patients with dental anxiety (28). Most dentists in the latter study reported that their training was inadequate.

A more recent Swedish study aimed to explore the dentists' skills in the management of dental anxiety (29). The authors reported on the current strategies when treating patients with dental anxiety. Similarly, the main aim of the present study was to gain a better understanding of the management of dental anxiety reported by dental practitioners in western Switzerland. Further aims included the assessment of their current treatment strategies and their need for further education.

## **Materials and Methods**

### *Questionnaire*

In 2013, an electronic 18-item questionnaire was created using Google Docs consisting primarily of check boxes to allow selection by the respondent. The topics included 1) demographic information, 2) treatment of dental phobic patients during emergency service, 3) assessment of dental anxiety in the dental practice, 4) attitude towards patients with dental anxiety and dental phobia, 5) anxiety reduction methods, 6) education and training in anxiety reduction methods, 7) dental care settings for patients with dental anxiety and dental phobia.

### *Identification of dental practitioners*

A total of 754 dental practitioners in western Switzerland were identified from the contact database of the Swiss Dental Association (SSO). In January 2013, an e-mail circular containing an accompanying letter and a questionnaire was electronically sent out to a total of 726 dental practitioners. A printed version of the questionnaire was sent by postal mail to a total of 28 dental practitioners where e-mail addresses were missing. Recipients were invited to reply by e-mail or postal mail, respectively. Up to three follow-up e-mails were sent.

### *Statistical analysis*

Data were anonymised and entered into an Excel spreadsheet (Microsoft Corporation, Redmond, WA, USA). All analyses were conducted with IBM SPSS (Version 18.0.0, Polar Engineering and Consulting, Armonk, NY, USA). Descriptive statistics were used to generate means, percentages, and standard errors. Logistic regressions were used to determine the strength of association with binary variables. Distributions were evaluated using Pearson's chi square tests. A p-value of  $<0.05$  was defined to be statistically significant.

## Results

A total of 143 dental practitioners (18.9%) responded by e-mail or postal mail. Following validation, 140 questionnaires (18.6%) were included in the analysis (Table 1).

### *Demographic information*

A total of 35 females (25.0%) and 105 males (75.0%) responded to the survey (Table 1). More than a third of the respondents (37.9%) graduated in the nineteen-eighties while almost three out of four (72.1%) reported to work in a dental practice with one practitioner. The majority of the respondents stated to work between 35 to 42 hours weekly (59.3%) as a general dentist (86.4%). About one out of five (21.4%) reported to work in a rural area defined as an agglomeration with less than 10'000 inhabitants (Table 1).

### *Treatment of dental phobic patients during emergency service*

About one out of five respondents (20.9%) had two occurrences in their past when treating dental phobic patients during emergency services (Table 2). When pooling the total number of occurrences, it was found that about four out of five practitioners (79.4%) involved with dental emergency service in their past had at least one occurrence with dental phobic patients (Table 2).

### *Attitude towards patients with dental anxiety and dental phobia*

The respondents' attitude towards dental anxiety is illustrated in table 3. A majority of the respondents agreed that dental anxiety both increases the number of missed appointments (88.6%; n=124) and reinforces such disruptive behaviours (87.9%; n=123).

The majority of the respondents stated that both dental anxiety and dental phobia



increases stress in the dental practice with frequencies of 90.0% and 88.5%, respectively. Respondents generally reported a higher intensity of stress treating dental phobic patients in comparison to treating patients with dental anxiety (Figure 1). However, when pooling those respondents reporting three or more occurrences with dental phobic patients in their past, no increase of their stress levels was found (OR=0.9; p=0.783).

Moreover, the majority of the respondents assumed that for patients dental anxiety increases the difficulty to access dental care (96.4%; n=134) and thus felt that dentists are responsible to help their anxious patients (92.6%; n=125) (Table 3).

#### *Assessment of dental anxiety in the dental practice*

The majority of the respondents (93.5%; n=130) reported to never use specific methods to assess dental anxiety in their dental practice while 6.5% (n=9) claimed to specifically assess the level of dental anxiety with their patients (Table 4). Of these only two (2.2%) used written questionnaires.

A total of 42 of the respondents (31.6%) reported to use non-specific means for the assessment of dental anxiety. The majority of these used conversational (40.5%; n=17) and observational (23.8%; n=10) methods while some of the respondents reported instead to provide information about dental care, to be calm, or to experiment using common sense with their patients (Table 4).

#### *Anxiety reduction methods*

A total of 21 practitioners responding to this survey (15.0%) never used any anxiety reduction method (Table 5). Among the 119 respondents using anxiety reduction methods (85.0%), overall 51 (42.9%) reported to use pharmacological methods while the majority (89.9%; n=107) used psychological methods. About a third (32.8%; n=39) stated to use both.

The most preferred psychological methods were “tell, show, do” (64.8%; n=68) and “relaxation” (48.6%; n=51). Furthermore, the most frequently used pharmacological method prescribed by 78.4% (n=41) of the respondents applying pharmacotherapy was oral sedation with benzodiazepine (Table 5).

Evaluating potential barriers towards the use of either psychological or pharmacological methods respondents mainly reported to lack adequate education and training in this specific field. Concerning pharmacological methods, up to 36.1% (n=22) of the respondents admitted to lack confidence and safety while 39.3% (n=24) judged that pharmacological anxiety reduction methods were not necessary (Figure 2).

Overall, less than two-thirds of the respondents (61.8%; n=84) referred their patients with dental anxiety while the majority of these (76.3%; n=61) were referred for pharmacological sedation (Figure 3).

The use of both psychological and pharmacological anxiety reduction methods was further associated with the demographic variables collected in this study. Logistic regression revealed positive associations with both gender and agglomeration of the respondents. Female dentists compared with their male colleagues were using psychological anxiety reduction methods three times more frequently than male dentists reaching borderline statistical significance (odds ratio (OR) 3.0,  $p=0.0591$ ). Concerning the ratio between gender and the category of “not using any anxiety reduction method (psychological or pharmacological)” an OR of 3.6 ( $p=0.07$ ) was found indicating that the proportion of males was much predominant in that group, however, without reaching statistical significance.

Furthermore, a statistically significant association was found between the smaller agglomerations (less than 50'000 inhabitants) and those respondents never using any anxiety reduction method (OR=4.8,  $p=0.0115$ ).

### *Education and training in anxiety reduction methods*

Out of 140 respondents, only 28 (20.1%) have received education and training in dental anxiety reduction methods (Table 6). The majority of these (66.4%; n=83) stated that their education and training was inadequate and 55.8% (n=77) requested further education and training in these methods.

The request for further education and training was further associated with the demographic variables collected from this sample. Logistic regression revealed that female dentists less likely requested further training than their male colleagues (OR=0.5, p=0.54).

### *Dental care settings for patients with dental anxiety and dental phobia*

More than half of the respondents (63.6%; n=82) requested a fear clinic in western Switzerland (Table 7). The majority of these argued that 1) oral health of dental phobic patients deteriorated intensely (73.5%; n=97), 2) claimed that current dental care settings for patients with dental anxiety and dental phobia as inadequate (62.5%; n=75), and 3) judged that the issues raised are a public concern (76.5%; n=62).

Further logistic regression revealed that specialists in comparison to general dentists were about three times less likely to feel responsible to be involved with the management of dental anxiety in their dental practice (OR=0.3, p=0.1309).

## **Discussion**

The majority of dental practitioners (79.4%) responding to this survey had at least one occurrence in their past with a dental phobic patient during emergency service. While anxiety reduction methods were used frequently (85.0%) by the respondents, among them female dentists used psychological anxiety reduction methods three times more frequently than their male colleagues. Interestingly, only 20.1% of the respondents have received education and training in dental anxiety reduction methods. The majority of these (66.4%) stated that their education and training was inadequate and thus requested further education and training in these methods.

The variables evaluated in this study were frequently used in other trials in the past assessing the management of dental anxiety in the dental practice including specific assessment methods, various means for dental anxiety reduction therapy, and further needs for education and training.

With an overall response rate of 18.6%, the data analysed in the present study appear to be limited in comparison with three other studies on this topic whose response rates were 73% with the study of Hill (2008) as well as 84% with the study of Dailey (2001) or 69% with the study of Brahm (2013) (17, 29, 30). However, since all the contact information was derived from the Swiss Dental Association (SSO) database, the responses collected in this study can be interpreted as reliable. Simultaneously, the response rate of 18.6% may reflect some of the current diversity in Switzerland related to the topic investigated.

### *Gender*

Dailey and co-workers (2001) reported that male dentists in comparison to their female

colleagues were more likely to use psychometric tests to assess the level of dental anxiety before treating their patients (30). Additionally, Brahm and co-workers (2013) in their study stated that female dentists used anxiety-reducing methods more frequently than their male colleagues (29).

The findings of this study are in alignment with the latter indicating that female dentists were using psychological anxiety reduction methods three times more likely in comparison to their male colleagues. Furthermore, male dentists were 3.6 times more often not using any anxiety reduction method. Interestingly, even if not reaching statistical significance, female dentists in this study were less likely to request further education and training. Thus, it may be assumed from these findings that female dentists feel more confident through their experience and in turn less likely feel the need of extra training in this specific field.

#### *Weekly working hours*

A number of studies suggested that dentists working higher numbers of weekly-hours suffer increased stress levels and thus spend less time with their anxious patients (19, 31, 32). Therefore, it was evaluated in this study whether dentists with *lower* numbers of weekly hours were more likely to apply time consuming *psychological* methods in comparison to their colleagues working *higher* numbers of weekly hours thus preferring *pharmacological* methods such as oral sedation with benzodiazepine. However, no positive association was found between the number of weekly hours and the type of anxiety reduction methods used. One explanation of this finding may be the flexibility of the Swiss dental reimbursement system which allows the billing of treatment time spent at each appointment hereby not affecting the selection of anxiety reduction therapy in this study.

#### *Domains (Specialisation)*

Current evidence suggests that a higher degree of specialisation in the dental field may

decrease the dental practitioner's empathy (33-37). In this study, specialists were indeed about three times less likely to feel responsible to help anxiety patients when compared to general dentists, however, without reaching a statistical significant difference.

### *Agglomeration*

Heaton and co-workers in their study (2004) concluded that patients in rural areas seek more dental emergency service but did not experience increased dental fear (38). In alignment with Heaton's findings, dentists from rural areas in this study as defined by agglomerations with less than 50'000 inhabitants were about five times less likely to use dental anxiety reduction methods when compared to their colleagues from urban area reaching statistical significance.

Educating their patients against barriers towards good oral health is the final statement of Heaton and co-workers (2004) (38). In addition, evidence has shown that behavioural modification of health-beliefs allowing better application of dental anxiety reduction methods could help both the rural population and the dental practitioner.

### *Treatment of dental phobic patients during emergency service*

With patients suffering from dental phobia it can be assumed that the intensity of their oral pain must counterbalance the intensity of their dental fear in order for these patients to schedule a dental emergency appointment. Dental emergency services in Switzerland are a legal requirement. Consequently, the chances of encountering a dental phobic patient specifically within this framework are increased. From both the patient's and the dentist's point of view, the framework of dental emergency services in Switzerland may not allow for a more comfortable dental care setting. The current setting may result in a higher level of stress for both the patient and the dentist. However, with this study it was not confirmed that dental practitioners reporting a higher number of occurrences with dental phobic patients claimed to be more stressed when compared to their colleagues with fewer occurrences.

### *Stress*

In their study, Hill and co-workers (2004) reported that 91% of their responding dentists felt stressed by treating their anxiety patients (10). In the present study, similar frequencies were found with the treatment of patients with both dental anxiety (90.0%) and dental phobia (88.5%). Furthermore, dentists in this study reported that stress was more intense when treating patients with dental phobia when compared to treating dental anxiety patients.

### *Responsibility*

In a survey of British dentists assessing the needs of dental anxiety therapy, 85% of the respondents overall agreed that dentists had the responsibility to help dental anxiety patients (17). In this study, with 92% of the respondents feeling responsible to help their patients with dental anxiety, similar results were found.

### *Assessment of dental anxiety in the dental practice*

Dailey and co-workers in their study (2001) found that only 20% dental practitioners reported to use written dental anxiety assessment questionnaires (30). In this survey only 2.2% of the respondents indicated that they were using written questionnaires. Moreover, only one of them mentioned to use the current psychometric test for the assessment of dental anxiety.

About a third of the respondents in the present study claimed to use other means of assessing dental anxiety with their patients. Interestingly, Dailey and co-workers<sup>36</sup> stated that “Many dentists believe that they can reliably recognize dental anxiety in their patients based on clinical impression alone.” As Dailey (2001) further mentions, however, current evidence indicates that this was not always the case and that there were discrepancies between patients’ self-reports and clinicians’ assessments of patients’ dental anxiety (30). Moreover, according to Dailey, patients “attempt to mask their dental anxiety so as to prevent disruption to the

dentists' treatment schedule'' (30).

#### *Dental anxiety reduction methods*

Dental anxiety reduction can be treated using psychological and pharmacological methods or a combination thereof (5, 39). Psychological methods are used to establish rapport and self-confidence in order to maintain the patient's self-control during the dental treatment. Pharmacological support, including orally administered sedation, nitrous oxide sedation, and intravenously administered sedation may be used in situations of increased stress during a given dental treatment. Further coping strategies consist of different methods that are taught to the patient to reduce anxiety such as distraction, relaxation, and hypnosis. In a prospective clinical study by Wannemüller and co-workers (2011), the authors have investigated the following anxiety reduction methods in patients suffering from dental phobia: 1) cognitive behavioural therapy (CBT), 2) individualised hypnosis, 3) standardised hypnosis, and 4) general anaesthesia (GA) (40). While CBT was provided by postgraduate clinical psychologists in 2 sessions for 60 and 50 minutes, respectively, both methods of hypnosis were performed during dental treatment using audio CDs playing instructions for either hypnosis or relaxation. Interestingly, both standardised and individualised hypnosis demonstrated greater anxiety reduction scores in comparison to CBT and GA one week following the last dental appointment. Since both methods for hypnosis did not require further training of the dental professionals, these methods may become valuable in case dentists do not have access to education and training in anxiety reduction methods.

Brahm and co-workers (2013) pointed out that some 77% of their respondents used benzodiazepine medication for anxiety reduction (29). In turn, 29.3% of the respondents to the present survey reported to use oral sedation for the reduction of dental anxiety. Concerning psychological methods, in Brahm's study, 86% of their respondents used "Tell,



show, do” and 68% used “relaxation”. The respective frequencies of the present study were 48.5% for “tell, show, do” and 36.4% for “relaxation”. However, these results still confirm Brahm’s statement that “In general, anxiety-reducing methods were used more often by dentists trained in Sweden compared with their colleagues trained in other countries”.

Regarding the choice of dental anxiety reduction methods, Berggren (2001) advises in his well-worded report that “Dental status, time, cost, and the patient’s preferences all are taken into account when a specific therapy is planned (41). An evaluation of the patient’s personality and psychological resources is included, albeit seldom in a structured way. However, this process is by no means ‘objective,’ but is influenced by the dentist’s skills, interests, and preferences, and his or her awareness and knowledge about each of the above-mentioned factors” (1).

#### *Barriers towards the use of anxiety reduction methods*

In Hill’s study (2008), dentists were asked to share their reasons for not using any anxiety reduction methods in their dental practice (17). Most dentists in that study reported the lack of both time and reimbursement as well as a shortage of confidence in using these methods. In this study, respondents mainly claimed a lack of proper education followed by a lack of time in particular for the use of psychological methods. Interestingly, however, both inadequacy of their reimbursement or treatment costs – possibly due to the flexibility of the Swiss dental reimbursement system – were not seen as a relevant factor.

#### *Education and training in anxiety reduction methods*

Brahm and his co-workers (2013) reported in their survey that 61.4% of their respondents were educated and trained in dental anxiety reduction methods during their postgraduate education (29). Further studies revealed frequencies of education and training at 63.4% in

Sweden (3) and at 31.2% in other countries (5-7, 21). In the present study, only 20.1% of the respondents had received education and training in this field.

In their study, Hill and co-workers (2008) evaluated the dentists' attitudes on the quality of education and training (17). Some 65% admitted that the teaching was less than adequate concerning the use of psychological methods whereas 44% indicated that they would be interested in further training of these methods. Respondents to the present survey shared similar opinions: some 66% admitted that their education and training was inadequate whereas 56% requested further education and training.

#### *Dental care settings for patients with dental anxiety and dental phobia*

Hakeberg and co-workers (1993) and other groups elaborated a vast amount of clinical evidence on the negative impact of dental anxiety on oral health by comparing individuals with dental phobia and those without dental anxiety (23, 42-44). Furthermore, Kent and co-workers (1996) presented social and psychological effects of patients with severe dental anxiety (dental phobia) (45). Moreover, a number of additional studies report that both dental anxiety and dental phobia have an impact on the number of cancelled or missed appointments and on late arrivals (3-7, 9).

In alignment with this evidence, in the present study, the majority of dental practitioners reported that oral deteriorations of phobic patients were severe. Almost two thirds admitted that our dental system for phobic patient was inadequate and thus claimed that the instalment of a fear clinic (institution providing both pharmacological and psychological treatment) may be indicated.

## **Conclusion**

Even though both female and male dentists reported to have experienced patients with dental phobia and increased stress levels when treating these patients, female dentists were more frequently using dental anxiety reduction methods. In agreement with the requests from the respondents to this survey it can be concluded that more education and training of dental anxiety reduction methods are needed.

Aiming for a better management of dental anxiety in the dental practice may both reduce stress for patients with dental fear and give benefits to the members of the dental team. Further improvements in dental education that specifically address both the assessment of dental anxiety and the provision of anxiety reduction methods may help to improve the dental care setting and the quality of life with their patients.

## References

- 1 Berggren U and Meynert G. Dental fear and avoidance: Causes, symptoms, and consequences. *J Am Dent Assoc* 1984; 109 (2): 247-251.
- 2 Milgrom P, Weinstein P and Getz T. Treating fearful dental patients: A patient management handbook. Seattle: Reston Prentice Hall, 1996.
- 3 Hagglin C. Dental anxiety in a swedish city population of women: A cross-sectional and longitudinal study of prevalence, dental care utilisation and oral and mental health factors. Gothenburg: University of Gothenburg, 2000.
- 4 Hakeberg M, Berggren U and Carlsson SG. Prevalence of dental anxiety in an adult population in a major urban area in sweden. *Community Dent Oral Epidemiol* 1992; 20 (2): 97-101.
- 5 Milgrom P, Fiset L, Melnick S and Weinstein P. The prevalence and practice management consequences of dental fear in a major us city. *J Am Dent Assoc* 1988; 116 (6): 641-647.
- 6 Moore R, Birn H, Kirkegaard E, Brodsgaard I and Scheutz F. Prevalence and characteristics of dental anxiety in danish adults. *Community Dent Oral Epidemiol* 1993; 21 (5): 292-296.
- 7 Neverlien PO. Normative data for corah's dental anxiety scale (das) for the norwegian adult population. *Community Dent Oral Epidemiol* 1990; 18 (3): 162.
- 8 Oosterink FM, de Jongh A and Hoogstraten J. Prevalence of dental fear and phobia relative to other fear and phobia subtypes. *Eur J Oral Sci* 2009; 117 (2): 135-143.
- 9 Skaret E, Raadal M, Berg E and Kvale G. Dental anxiety among 18-yr-olds in norway. Prevalence and related factors. *Eur J Oral Sci* 1998; 106 (4): 835-843.
- 10 Vassend O. Anxiety, pain and discomfort associated with dental treatment. *Behav Res Ther* 1993; 31 (7): 659-666.
- 11 Corah NL. Development of a dental anxiety scale. *J Dent Res* 1969; 48 (4): 596.

- 12 Frazer M and Hampson S. Some personality factors related to dental anxiety and fear of pain. *Br Dent J* 1988; 165 (12): 436-439.
- 13 Armfield JM, Enkling N, Wolf CA and Ramseier CA. Dental fear and satisfaction with dental services in switzerland. *J Public Health Dent* 2014; 74 (1): 57-63.
- 14 Thomson WM, Dixon GS and Kruger E. The west coast study. Ii: Dental anxiety and satisfaction with dental services. *N Z Dent J* 1999; 95 (420): 44-48.
- 15 Hakeberg M, Klingberg G, Noren JG and Berggren U. Swedish dentists' perceptions of their patients. *Acta Odontol Scand* 1992; 50 (4): 245-252.
- 16 Weiner AA and Weinstein P. Dentists' knowledge, attitudes, and assessment practices in relation to fearful dental patients: A pilot study. *Gen Dent* 1995; 43 (2): 164-168.
- 17 Hill KB, Hainsworth JM, Burke FJ and Fairbrother KJ. Evaluation of dentists' perceived needs regarding treatment of the anxious patient. *Br Dent J* 2008; 204 (8): E13; discussion 442-443.
- 18 Moore R and Brodsgaard I. Dentists' perceived stress and its relation to perceptions about anxious patients. *Community Dent Oral Epidemiol* 2001; 29 (1): 73-80.
- 19 O'Shea RM, Corah NL and Ayer WA. Sources of dentists' stress. *J Am Dent Assoc* 1984; 109 (1): 48-51.
- 20 Agdal ML, Raadal M, Skaret E and Kvale G. Oral health and oral treatment needs in patients fulfilling the dsm-iv criteria for dental phobia: Possible influence on the outcome of cognitive behavioral therapy. *Acta Odontol Scand* 2008; 66 (1): 1-6.
- 21 Armfield JM, Slade GD and Spencer AJ. Dental fear and adult oral health in australia. *Community Dent Oral Epidemiol* 2009; 37 (3): 220-230.
- 22 Boman UW, Lundgren J, Berggren U and Carlsson SG. Psychosocial and dental factors in the maintenance of severe dental fear. *Swed Dent J* 2010; 34 (3): 121-127.
- 23 Hakeberg M, Berggren U and Grondahl HG. A radiographic study of dental health in adult patients with dental anxiety. *Community Dent Oral Epidemiol* 1993; 21 (1): 27-30.

- 24 Hallstrom T and Halling A. Prevalence of dentistry phobia and its relation to missing teeth, alveolar bone loss and dental care habits in an urban community sample. *Acta Psychiatr Scand* 1984; 70 (5): 438-446.
- 25 Ng SK and Leung WK. A community study on the relationship of dental anxiety with oral health status and oral health-related quality of life. *Community Dent Oral Epidemiol* 2008; 36 (4): 347-356.
- 26 Gisler V, Bassetti R, Mericske-Stern R, Bayer S and Enkling N. A cross-sectional analysis of the prevalence of dental anxiety and its relation to the oral health-related quality of life in patients with dental treatment needs at a university clinic in switzerland. *Gerodontology* 2012; 29 (2): e290-296.
- 27 Newton JT, Allen CD, Coates J, Turner A and Prior J. How to reduce the stress of general dental practice: The need for research into the effectiveness of multifaceted interventions. *Br Dent J* 2006; 200 (8): 437-440.
- 28 Adair P. A scottish survey of primary care dental practitioners' training and education needs in managing the patient with dental anxiety. Report to primary care development fund. In: Executive S, ed. Edinburgh: Scottish Executive, 2003.
- 29 Brahm CO, Lundgren J, Carlsson SG, Nilsson P, Hultqvist J and Hagglin C. Dentists' skills with fearful patients: Education and treatment. *Eur J Oral Sci* 2013; 121 (3 Pt 2): 283-291.
- 30 Dailey YM, Humphris GM and Lennon MA. The use of dental anxiety questionnaires: A survey of a group of uk dental practitioners. *Br Dent J* 2001; 190 (8): 450-453.
- 31 Rada RE and Johnson-Leong C. Stress, burnout, anxiety and depression among dentists. *J Am Dent Assoc* 2004; 135 (6): 788-794.
- 32 Turley M, Kinirons M and Freeman R. Occupational stress factors in hospital dentists. *Br Dent J* 1993; 175 (8): 285-288.
- 33 Diseker RA and Michielutte R. An analysis of empathy in medical students before and following clinical experience. *J Med Educ* 1981; 56 (12): 1004-1010.
- 34 Hojat M, Mangione S, Nasca TJ, et al. The jefferson scale of empathy: Development

- and preliminary psychometric data. *Educational and Psychol Measurement* 2001; 61: 349–365.
- 35 Hojat M, Mangione S, Nasca TJ, et al. An empirical study of decline in empathy in medical school. *Med Educ* 2004; 38 (9): 934-941.
  - 36 Marcus ER. Psychodynamic social science and medical education. *J Psychother Pract Res* 1999; 8 (3): 191-194.
  - 37 Sherman JJ and Cramer A. Measurement of changes in empathy during dental school. *J Dent Educ* 2005; 69 (3): 338-345.
  - 38 Heaton LJ, Smith TA and Raybould TP. Factors influencing use of dental services in rural and urban communities: Considerations for practitioners in underserved areas. *J Dent Educ* 2004; 68 (10): 1081-1089.
  - 39 De Jongh A, Adair P and Meijerink-Anderson M. Clinical management of dental anxiety: What works for whom? *Int Dent J* 2005; 55 (2): 73-80.
  - 40 Wannemueller A, Joehren P, Haug S, Hatting M, Elsesser K and Sartory G. A practice-based comparison of brief cognitive behavioural treatment, two kinds of hypnosis and general anaesthesia in dental phobia. *Psychother Psychosom* 2011; 80 (3): 159-165.
  - 41 Berggren U. Long-term management of the fearful adult patient using behavior modification and other modalities. *J Dent Educ* 2001; 65 (12): 1357-1368.
  - 42 Berggren U. Psychosocial effects associated with dental fear in adult dental patients with avoidance behaviours. *Psychology Health* 1993; (8): 185–196.
  - 43 Kaufman E, Rand RS, Gordon M and Cohen HS. Dental anxiety and oral health in young israeli male adults. *Community Dent Health* 1992; 9 (2): 125-132.
  - 44 Locker D and Liddell A. Clinical correlates of dental anxiety among older adults. *Community Dent Oral Epidemiol* 1992; 20 (6): 372-375.
  - 45 Kent G, Rubin G, Getz T and Humphris G. Development of a scale to measure the social and psychological effects of severe dental anxiety: Social attributes of the dental anxiety scale. *Community Dent Oral Epidemiol* 1996; 24 (6): 394-397.

## Tables and Figures

*Table 1: Demographic information on n=140 dental practitioners responding the survey.*

	All surveys		
	n	% respondents	% responses
Total	140	100.0	100.0
<u>Gender</u>			
Female	35	25.0	25.0
Male	105	75.0	75.0
<u>Year of graduation</u>			
1960-1970	5	3.6	3.6
1971-1980	27	19.3	19.3
1981-1990	53	37.9	37.9
1991-2000	33	23.6	23.6
2001-2010	22	15.7	15.7
<u>Type of working place</u>			
Dental practice, one practitioner	101	72.1	67.8
Dental practice, more than one practitioner	37	26.4	24.8
Private clinic	4	2.9	2.7
Hospital	4	2.9	2.7
Other	3	2.1	2.0
<u>Weekly working hours</u>			
Less than 35 hours	23	16.4	16.4
Between 35-42 hours	83	59.3	59.3
More than 42 hours	34	24.3	24.3
<u>Domains</u>			
General dentistry	121	86.4	74.7
Pedodontology	11	7.9	6.8
Periodontology	7	5.0	4.3
Maxillo-facial surgery	2	1.4	6.2
Prosthetic dentistry	7	5.0	1.2
Orthodontology	10	7.1	4.3
Other (e.g. implant dentistry)	4	2.9	2.5
<u>Agglomeration</u>			
More than 100'000 inhabitants	48	34.3	34.0
Between 100'000 and 50 000 inhabitants	9	6.4	6.4
Between 50'000 and 10'000 inhabitants	54	38.6	38.3
Less than 10'000 inhabitants	30	21.4	21.3
<u>Canton</u>			
Fribourg (FR)	20	14.3	14.0
Genève (GE)	28	20.0	19.6
Jura (JU)	6	4.3	4.2
Neuchâtel (NE)	16	11.4	11.2
Valais (VS)	25	17.9	17.5
Vaud (VD)	48	34.3	33.6



*Table 2: Treatment of dental phobic patients during emergency service.*

	All surveys		
	n	% respondents	% responses
Total	139		100
<u>Number of occurrences</u>			
None	21	15.1	14.8
1 occurrence	24	17.3	16.9
2 occurrences	30	20.9	21.1
3 occurrences	16	11.5	11.2
More than 3 occurrences	5	3.6	9.1
Not involved with dental emergency service	38	27.3	26.8
Other	8	4.4	26.8

*Table 3: Attitude towards patients with dental anxiety and dental phobia.*

	All surveys		
	n	% respondents	% responses
Total	140		100
<u>Dental anxiety increases the number of missed appointments</u>			
Yes	124	88.6	88.6
No	16	11.4	11.4
<u>Dental anxiety reinforces disruptive behaviours</u>			
Yes	123	87.9	87.9
No	17	12.1	12.1
<u>Dental anxiety increases stress in the dental practice</u>			
Yes	126	90.0	90.0
<u>Level of increase</u>			
Weak	26	21.6	20.2
Moderate	63	50.0	48.8
Intense	36	28.6	27.9
Extreme	1	0.8	0.7
Other	3	2.4	2.3
No	14	10.0	10.0
<u>Dental phobia increases stress in the dental practice</u>			
Yes	123	88.5	88.4
<u>Level of increase</u>			
Weak	20	16.3	16.2
Moderate	49	39.8	39.8
Intense	42	34.2	34.2
Extreme	10	8.1	8.1
Other	2	1.6	1.6
No	16	11.5	11.5
<u>Dental anxiety increases difficulty to access dental care</u>			
Yes	134	96.4	96.4
No	5	3.6	3.6
<u>Dentists are responsible to help their anxiety patients</u>			
Yes	125	92.6	88.0
No	17	12.6	12.0

*Table 4: Assessment of dental anxiety in the dental practice.*

	All surveys		
	n	% respondents	% responses
Total	139		100
<u>Use of specific dental anxiety assessment method</u>			
Yes	9	6.5	6.5
No	130	93.5	93.5
<u>Written questionnaires</u>			
Yes	2	2.2	2.2
No	89	97.8	97.8
<u>Use of non-specific means</u>			
Yes	42	31.6	31.6
No	91	62.4	62.4
<u>Type of means</u>			
Conversation (discussion, dialogue)	17	40.5	30.9
Active listening (interviewing)	6	14.3	10.9
Targeted questioning	2	4.8	3.6
Patient history (anamnesis, dental history)	7	16.7	12.7
Visual analogic scale (VAS)	1	2.4	1.8
Observation (behavioural observation, body language)	10	23.8	18.2
Deterioration of oral status	1	2.4	1.8
Providing information about dental care	4	9.5	7.3
Being calm (experimenting using common sense)	3	7.1	5.5
Other	4	9.5	7.3

Table 5: Anxiety reduction methods.

	All surveys		
	n	% respondents	% responses
Total	140	100	100
<u>Anxiety reduction method</u>			
No	21	15.0	15.0
Yes	119	85.0	85.0
<u>Type of method</u>			
Pharmacological	51	42.9	42.8
Psychological	107	89.9	89.9
Only pharmacological	14	10.1	10.1
Only psychological	71	57.1	57.1
Pharmacological and Psychological	37	32.8	32.8
<u>Psychological</u>			
Cognitive Behavioural Therapy (CBT)	22	21.0	11.6
Eriksonian hypnodontia	13	12.4	6.9
Eye Movement Desensitization and Reprocessing (EMDR)	3	2.9	1.6
Relaxation	51	48.6	27.0
Latrosedation	3	2.9	1.6
Tell, show, do	68	64.8	36.0
Biofeedback	4	3.8	2.1
Others	25	23.8	13.2
<u>Barriers towards psychological methods</u>			
Not enough time	8	34.8	18.2
Not necessary	7	30.4	15.9
No proper education in that domain	13	56.5	29.6
Do not feel confident	3	13.0	6.8
Do not feel safe	0	0	0
Inadequate fee	3	13.0	6.8
Not interested	3	13.0	6.8
Equipment	0	0	0
Cost	1	4.4	2.3
Difficulty in getting staff	4	17.4	9.1
Other	2	8.7	4.5
<u>Pharmacological</u>			
Oral sedation	41	78.4	60.6
Deep sedation (IV)	2	3.9	3.0
Nitrous monoxide (N <sub>2</sub> O)	9	17.7	13.6
Nitrous oxide and oxygen (N <sub>2</sub> O+O <sub>2</sub> )	1	2.0	1.5
Narcosis	7	13.7	10.6
Other	4	13.7	10.6
<u>Barriers towards pharmacological methods</u>			
Not enough time	7	11.5	5.5
Not necessary	24	39.3	17.1
No proper education in that domain	31	50.8	23.3
Do not feel confident	8	13.1	5.5
Do not feel safe	14	23.0	10.3
No demand	16	27.9	13.0
Inadequate fee	3	4.9	2.1
Not interested	3	4.9	2.1
Equipment	10	16.4	8.2
Cost	6	9.8	4.1
Difficulty in getting staff	7	11.5	6.2
Other	3	4.9	2.7
<u>Refer anxiety patient</u>			
Yes	84	61.8	61.8
No	52	38.2	38.2
<u>Type of preferred method</u>			
Pharmacological (narcosis, deep sedation, N <sub>2</sub> O)	61	76.3	54.5
Psychological	25	31.1	22.3
Pharmacological + psychological	19	23.8	17.0
Other	7	8.8	6.1

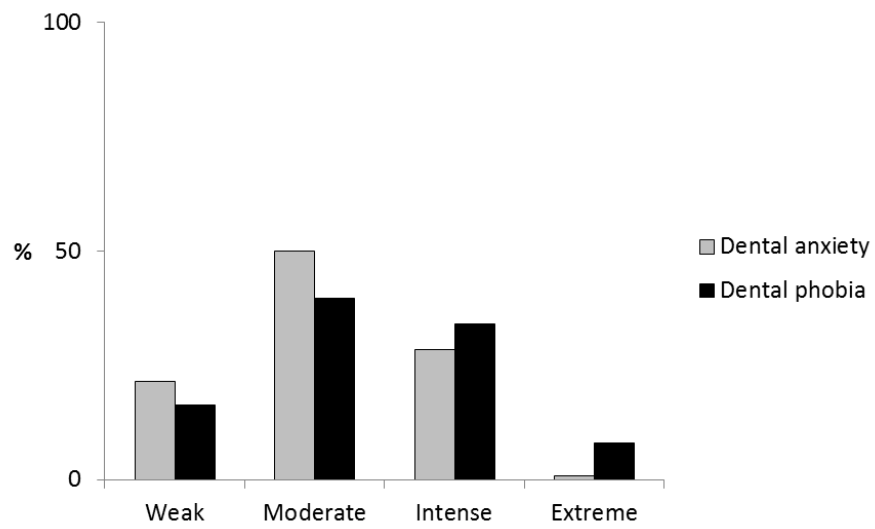
*Table 6. Education and training in anxiety reduction methods.*

	All surveys		
	n	% respondents	% responses
Total	140		100
<u>Education and training of anxiety reduction methods</u>			
Yes	28	20.1	20.1
No	111	79.9	79.9
<u>Types of education and training</u>			
Hypnosis	15	53.6	41.7
Therapies (CBT and others)	9	32.1	25.0
Post-graduate training at the University of Geneva	5	17.9	13.9
Pharmacological	5	17.9	13.9
Various	2	7.1	5.6
<u>Adequacy of previous education and training</u>			
Yes	45	36.0	35.2
No	83	66.4	64.9
<u>Request further education and training</u>			
Yes	77	55.8	55.4
No	62	44.9	44.6

*Table 7. Dental care settings for patients with dental anxiety and dental phobia.*

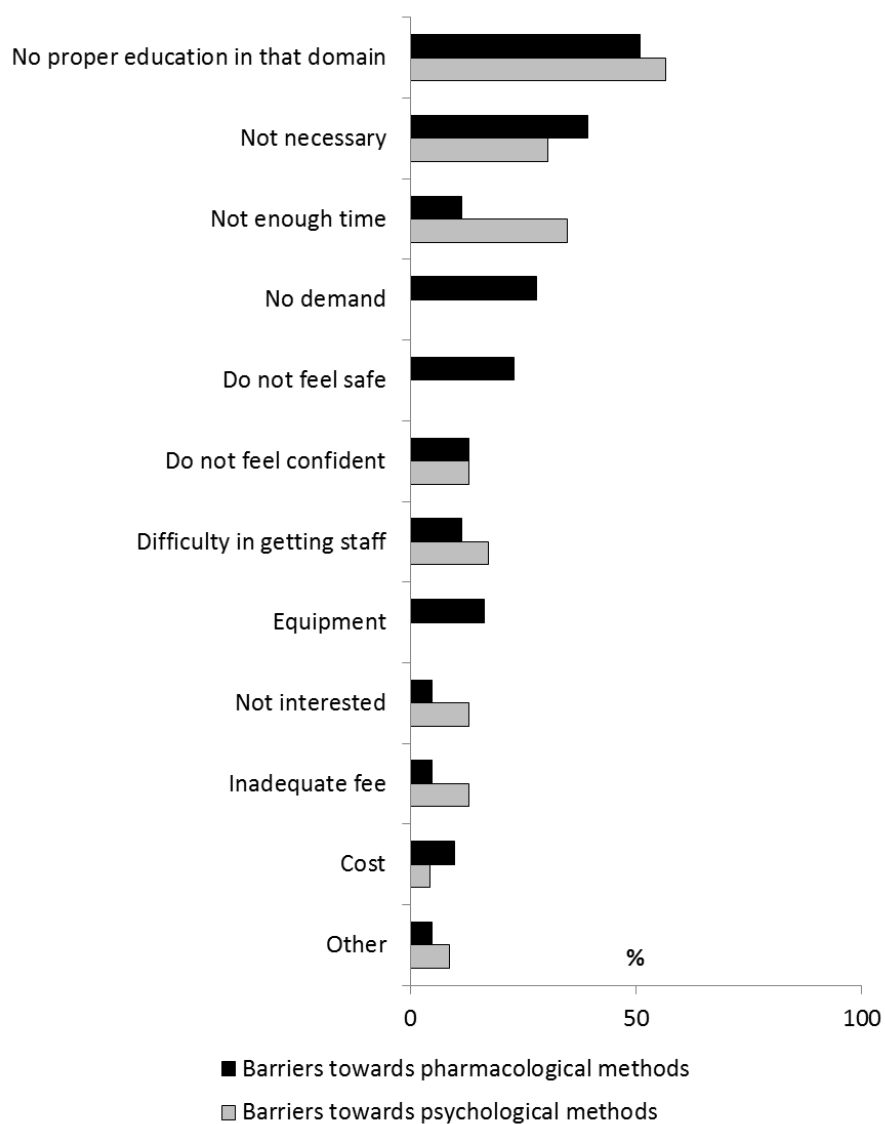
	All surveys		
	n	% respondents	% responses
Total	140		100
<u>Oral health deterioration of the phobic patients</u>			
Weak	6	4.5	4.0
Moderate	30	22.7	19.9
Intense	97	73.5	64.2
Extreme	14	10.6	9.3
Other	4	3.0	2.7
<u>Adequacy of dental care setting and infrastructure of care</u>			
Yes	53	44.2	41.4
No	75	62.5	58.6
<u>Public health concern</u>			
Yes	62	76.5	76.5
No	19	23.5	23.5
<u>Request of a fear clinic in western Switzerland</u>			
Yes	82	63.6	62.6
No	49	38.0	37.4

**Figure 1**



Level of stress in the dental practice between patients with dental phobia and dental anxiety.

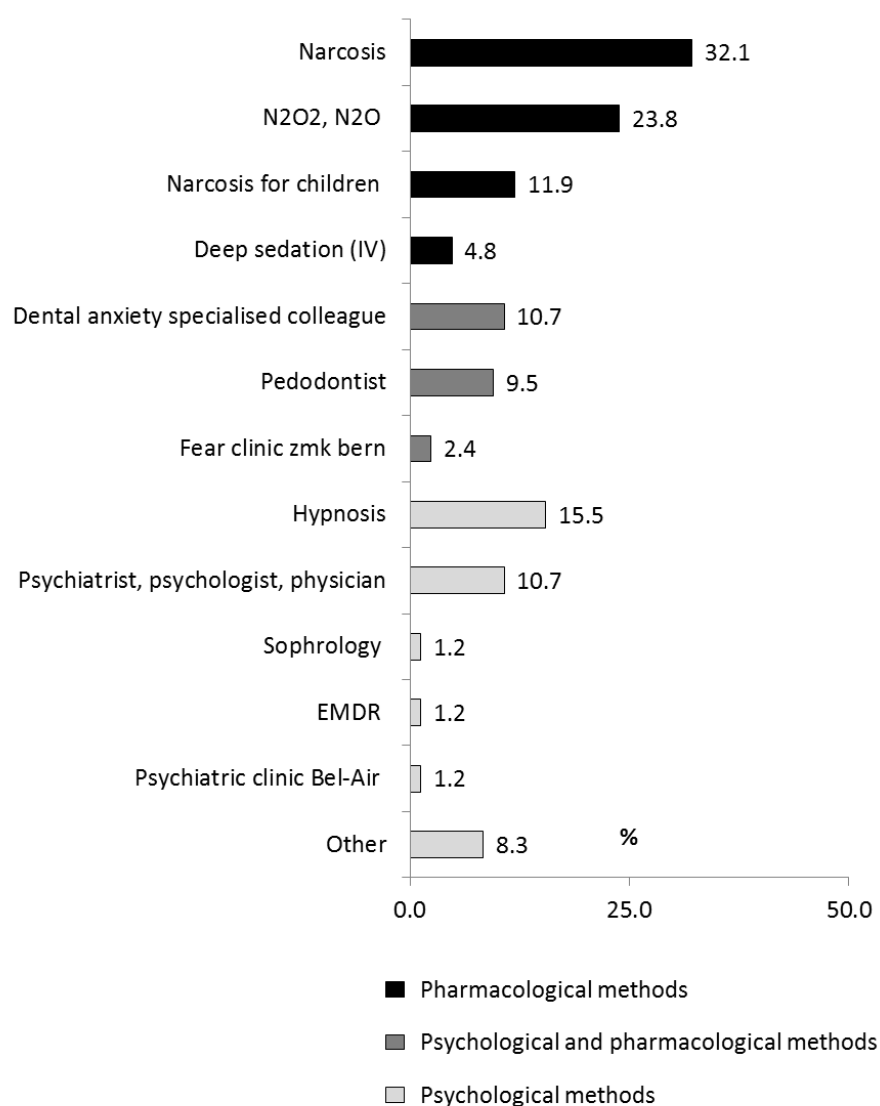
**Figure 2**



Barriers towards psychological and pharmacological methods.



**Figure 3**



Frequencies of referrals as reported by n=84 dental professionals, (N2O2: dinitrogen dioxide. N2O: nitrous oxide. IV: intravenous. EMDR: Eye Movement Desensitization and Reprocessing).